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Ethnobotany and Traditional Management of Drought Tolerant Tree Species in Homestead Forests of Bangladesh

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Abstract

A study has been conducted in the homesteads of drought-prone northwestern region of Bangladesh. Since there is no natural forest, the overall climatic condition is very harsh and progressive trend of desertification is threatening the livelihood of poor people. So it is important to carry out extensive plantations throughout the region to reverse the current trend of drought and desertification. The study identified a list of 19 drought tolerant species suitable for planting in the homesteads as well as in the vacant spaces. The rural people are heavily dependent on those species for their daily requirement of timber, fruits, fuel, and other non-timber products.

Introduction

Different terminologies are used to describe and define the homestead forests in different regions of the world. Most common terms used are, among others, homestead agroforestry (Leuschner and Khaleque 1987), mixed-garden horticulture (Terra 1954), homegarden (Ramsay and Wiresum 1976; Millat et al. 1996), Javanese homegarden (Soemarwoto et al. 1985), and homestead forest (Motiur et al. 2005). Homestead forests of Bangladesh constitute multi-storied vegetation of shrubs, bamboos, palms and trees that produce materials for a multitude of purposes, including fuel, shelter, structural materials, fruits, fodder, and medicines (Dauglas 1981). Though Bangladesh is predominantly a riverine country, the northwestern region is threatened by desertification. In addition to the environmental consequences, desertification is also threatening the livelihood of rural people. This is also one of the forest poor regions of the country too. Hence, it is urgently required to increase vegetation cover through development of homestead agroforestry traditionally adopted by rural people within their homesteads (Alam and Furukawa 2008). This agroforestry system in drought-prone areas provides a healthy ecosystem for humans, animals, birds, livestock and miscellaneous flora and fauna. The present study has been conducted to identify a list of drought tolerant tree species, their use and overall management.

The study area and research methodology

The current study is a part of a larger research project operated in the drought-prone northwestern region of

Bangladesh located between 24 54 and 25 06 north latitudes and between 88 24 and 88 39 east longitudes. The study area is a part of Barind Tract, the largest Pleistocene physiographic unit of the Bengal Basin (Banglapedia 2008). The average annual rainfall of the region varies from 1400mm to 1600mm. The value of the ratio of annual rainfall (R) to potential evapotranspiration (ET₀) for northwest Bangladesh is often less than the 0.65 threshold value. The results of existing drought situation and the trend of desertification can partly be attributed to the immediate effect of climate variability and change in the form of rainfall shortage and decreased level of atmospheric moisture. Generally, average temperature ranges between 25-35 °C during summer and 9-15 °C during winter. The hottest days in the region experience temperature about 45°C (Banglapedia 2008). Long-term observation of variation in climatic parameters shows that Bangladesh's drought-prone areas have become warmer and drier than 50 years ago and current projections suggest that the areas will become hotter, its nights will be warmer, and there will be an increased rainfall variation.

An explorative field survey has been conducted among the thirty-two randomly selected households. Semi-structured questionnaire was provided to the respondents to investigate the ethnobotanical use of tree species present in their homestead. Focus group discussions were also arranged to identify a list of species locally adapted in the region. Experts were also consulted to cross-check the information from scientific point of view.

Results and Discussion

In total 19 species has been identified during field survey as drought tolerant and suitable for extensive plantation in the vacant and bare spaces within the homesteads of northwestern region. Table 1 shows the scientific names of the species along with their English/local names, family, and principal ethnobotanical use. *Acacia catechu* is a leguminous species that produces, besides wood, important medicinal products. *Acacia nilotica*, a species of the same family provides a wide range of goods and services including timber, fodder, resin, and medicine. But in Bangladesh this species is well known for production of quality gums. *Aegle marmelos* produces fruits having medicinal value. *Anthocephalus chinensis* is used for timber and fuel and is also used in match factories as raw material. Chewing betel leaf with betel nut (*Areca catechu*) is a tradition among rural people throughout the subcontinent. Jackfruit is a multipurpose tree species that produces timber, fuel and fodder. The species bears national fruit of Bangladesh. *Averrhoa carambola* *Citrus grandis* *Lychi chinensis* *Phoenix sylvestris* and *Ziziphus jujube* produces quality and delicious fruits that are consumed for family nutrition and sold in the market for additional family income. Bamboo is known as “poor man’s timber” (FAO 1994; Paudel and Lobovikov 2003) because, it is widely used in rural construction works including fencing, house construction, and making agricultural implements. The study area is famous for producing quality mangos (*Mangifera indica*) of various varieties and the farmers produce mangos in commercial basis which are sold throughout the country. This is the most economically important fruit species of the region. There are extensive plantations of the species *Morus alba* throughout the region. This species are grown for rearing of silkworm for producing silk in sericulture enterprises.

Table 1: A list of drought-tolerant tree species locally adapted in the Bangladesh.

Sl	Scientific name	Local/English name	Family	Principal use
1	<i>Acacia catechu</i>	Khair	Leguminosae	M
2	<i>Acacia nilotica</i>	Babla	Leguminosae	Gum
	<i>Aegle marmelos</i>	Bel	Rutaceae	Fr, M
3	<i>Anthocephalus chinensis</i>	Kadam	Rubiaceae	T, Fu
4	<i>Areca catechu</i>	Betelnut	Palmae	T, Fu

5	<i>Artocarpus heterophyllus</i>	Jackfruit	Moraceae	T, Fr, Fu
6	<i>Averrhoa carambola</i>	Kamranga	Oxalidaceae	Fr
7	<i>Azadirachta indica</i>	Neem	Meliaceae	M
8	<i>Bambusa spp.</i>	Bamboo	Gramineae	Rural construction
9	<i>Citrus grandis</i>	Jambura	Rutaceae	Fr
10	<i>Cocos nucifera</i>	Coconut	Palmae	T, Fr, Fu
11	<i>Dalbergia sisoo</i>	Sisoo	Leguminosae	T, Fu
12	<i>Emblica officinalis</i>	Amloki	Euphorbiaceae	Fr, M
13	<i>Lychi chinensis</i>	Lychi	Sapindaceae	Fr
14	<i>Mangifera indica</i>	Mango	Anacardiaceae	Fr, T
15	<i>Morus alba</i>	Tut	Moraceae	Sericulture
16	<i>Phoenix sylvestris</i>	Khejur	Palmae	Fr
17	<i>Syzygium cumini</i>	Jam	Myrtaceae	Fr, T
18	<i>Terminalia arjuna</i>	Arjun	Combretaceae	M
19	<i>Ziziphus jujube</i>	Kul	Rhamnaceae	Fr

M=medicinal; Fr= fruit; T=timber; Fu=fuel

All the aforementioned species provides the rural people with a wide range of products and services beyond what is said here. Rural poor depend on these valuable trees for their subsistence and additional income when sold in the market. In addition, these tree species ‘fill gaps’ and acts as ‘safety nets’ during economically hard situation. Thus, in the cases when the agricultural crops fails due to severe drought spells and resulting in destruction of main income source, the farmers rely on homestead grown vegetation for their nutrition (in the form of fruits) and cash income (by selling timber and fruits in the market). In this way, vulnerability of livelihood is decreased to some extent in extreme environmental consequences. Thus growing drought tolerant species in the premises of living quarters is a significant adaptation to climate variability and change.

The study conducted on the traditional management exercises followed by the farmers in managing their homestead agroforestry resources showed that despite high socio-economic contribution, this traditional production system is being managed in traditional ways. Scientific knowledge and techniques are lacking. The farmers reported that they manually carry out cultural operations like weeding, mulching, and fencing. Of the tree level management, pruning, pollarding, and thinning are done at different intensity. Only few species are given special care as in the cases of mango, Palmyra palm, and coconut.

Conclusion

Growing more trees in the homesteads, around agricultural fields and other vacant spaces will increase the livelihood adaptation capacity of rural poor besides increasing forest coverage in the forest poor northwestern region. So, it is important that people are motivated and supplied with quality planting materials. Traditional management practices should be supplemented by scientific techniques.

References

- Alam M and Furukawa Y (2008) Climate change in Bangladesh: The role of smallholder agroforestry in mitigation of and adaptation to desertification. Paper presented in the International Conference on Adaptation of Forest and Forest Management to Changing Climate: A Review of Science, Practice and Policy, held in Umea, Sweden in 25-28 August 2008. (Unpublished manuscript)
- Banglapedia (2008) National Encyclopedia of Bangladesh. Asiatic Society of Bangladesh. Available at

<http://www.banglapedia.org>. (Accessed 10 October 2008).

- Douglas JJ 1981. Supply and demand of forest products and future development strategies, field document no. 2, UNDP/FAO/Planning Commission (GOB) Project BGD/78/010.
- FAO (1994) Non-wood forest products in Asia. Food and Agriculture Organization of the United Nations, Bangkok.
- Leuschner WA and Khaleque K (1987) Homestead forestry in Bangladesh. *Agroforestry Systems*, 5: 139-51.
- Millat-e-Mustafa MD, Hall JB and Tklehaimanot Z (1996) Structure and floristics of Bangladesh homegardens. *Agroforestry Systems*, 33(3): 263-280.
- Motiur MR, Furukawa Y, Kawata I, Rahman MM and Alam M (2005). Homestead forest resources and their role in household economy: A Case Study in the villages of Gazipur sadar upazila of central Bangladesh. *Small-scale Forest Economics, Management and Policy*, 4(3): 359-376.
- Paudel SK and Lobovikov M (2003) Bamboo housing: market potential for low-income groups. *Journal of Bamboo and Rattan*. 2(4): 381-396.
- Ramsay DM and Wiersum KF (1976) Problems of watershed management and development in the upper Solo river basin. Paper presented at the Conference on Ecological Guidelines for Forest, Land or Water Resources. Institute of Ecology, Bandung, Indonesia.
- Soemarwoto O, Soemarwoto I, Karyona, Soekartadiredja EM and Ramlan A (1985) The Javanese Homegardens as an integrated agro-ecosystem. *Nutrition Bulletin*, 7 (3): 44-7.
- Terra GJA (1954) Mixed garden horticulture in Java. *Malaysian Journal of Tropical Geography*, 1:33-43.